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OBSTRUCTIVE PHOSPHATE UROLITHIASIS IN A DROMEDARY CAMEL: A CASE REPORT

Carlos Gutierrez, Juan A. Corbera and Bernard Faye[1]
Veterinary Faculty, University of Las Palmas, 35413, Arucas, Las Palmas, Canary Islands, Spain.
[1]CIRAD-EMVT, Campus International de Baillarguet TA 30/A, 34398, Montpellier, France

ABSTRACT

An 8-year-old male dromedary camel was presented with a history of urine retention. Anamnesis revealed a 5 day history of lethargy, loss of appetite, oligodipsia and repetitive unsuccessful attempts at micturition. Careful rectal palpation revealed a urine filled urinary bladder. The animal was initially treated with butilscopolamine, 0.2 ml/kg intravenously every 6 h and ampicillin, 6 mg/kg intramuscularly every 8 h, fruitlessly. An amorphous material derivate from haemorrhagic exudate was removed. A small catheter (0.3 cm) was introduced cranially and only a few bloodish urine drops were obtained. Sediment examination revealed epithelial cells, erythrocytes, bacteria, spermatozoids and crystals, which were classified as phosphate crystals (struvite). Haematological and biochemical findings indicate a stress leukogram and renal parameters increased around 10 times the normal values. Despite all, blood parameters returned to physiological range within a few days.

Key words: Camel, obstructive, phosphate, urolithiasis

Urolithiasis is a common subclinical condition among ruminant raised in management system where the ration is composed primarily of grain or where animals graze certain types of pasture (Radostits *et al*, 2000). In camels, urolithiasis has been reported in dromedaries (Kock, 1985), bactrianus (Kuntze and Mill, 1975) and llamas (Kock and Fowler, 1982; McLaughlin and Evans, 1989). The condition appears to be more common in temperate climates, occurs in both females and males, castrated and intact, and there appears to be no age predisposition (Kock, 1985). However, obstructive urolithiasis is more common in castrated than in intact males due to less urethral development, particularly when the castration is performed in very young males. There is no verifiable evidence of obstructive urethral calculi in camels in their natural habitats. In zoological collections, causes such as urinary infections, metabolic disorders, malnutrition or climatic stress have been associated with urinary calculi in the dromedary (Kock, 1985).

Currently, there is minimal information about composition of uroliths in camelids. However, a large proportion of calcium (Kock, 1985), silica (Gutierrez *et al*, 1999), or amorphus and colloidal matrix without mineral constituents (Kock, 1985) have been reported as constituent of dromedary urotiths. The present communication describes a case of phosphate urolithiasis in a dromedary camel.

Clinical case

An 8-year-old male dromedary camel was presented with a history of urine retention. The animal belonged to a camel farm with tourist goal in the Canary Islands and no antecedents of urinary retention had been observed in the herd. Diet was composed of 4 kg of grains (particularly corn) and wheat straw *ad libitum* (around 4 kg per head). Salt was not added to the diet.

Anamnesis revealed a 5 day history of lethargy, loss of appetite, oligodipsia and repetitive unsuccessful attempts at micturition. Careful rectal palpation revealed a urine filled urinary bladder. Blood samples and a few drops of urine were collected for laboratory evaluation. The animal was initially treated with butilscopolamine, 0.2 ml/kg intravenously every 6 h and ampicillin, 6 mg/kg intramuscularly every 8 h, fruitlessly. Perineal urethrostomy was carried out without sedation due to adverse effects of xylazine in patients with severe uraemia (Singh *et al*, 1983). Epidural anaesthesia and local infiltration in the opertive site were performed using 2% lidocaine. Following urethrostomy an amorphous material derivate from haemorrhagic exudate was removed. No gross mineral material was observed. The urethral endothelium appeared grossly and brownish. Urine did not appear at that urethral opening point; then a small catheter (0.3 cm) was

SEND REPRINT REQUEST TO CARLOS GUTIERREZ cgutierrez@dpat.ulpgc.es

introduced cranially and only a few bloodish urine drops were obtained. Animal started voiding urine normally few hours later.

Blood analysis revealed the following data: white blood cells: 15.4 x 10^9/L (normal range 2.9-9.7 x 10^9/L); neutrophils: 9.1 x 10^9/L (normal range 0.9–6.8 x 10^9/L); urea: 49.4 mmol/L (normal range 2.6-8.05 mmol/L); creatinine: 1245 mmol/L (normal range 106-250 mmol/L). Urine sample was centrifuged at 1500 rpm and the sediment was stained using methylene blue. Sediment examination revealed epithelial cells, erythrocytes, bacteria, spermatozoids and crystals, which were classified as phosphate crystals (struvite) (Figs 1 and 2). After surgery, the animal recovered progressively and the laboratorial parameters returned to normal ranges within one week.

Discussion

It is known that the camel can produce urine with a concentration of salt almost twice that of sea water (Dorman, 1984), and that require 6 to 8 times more salt for maintenance than other livestock (Nigam, 1992). Despite of this uroliths are commonly found in the urinary bladder and urethra in dromedary camels, but a little information is available in the literature.

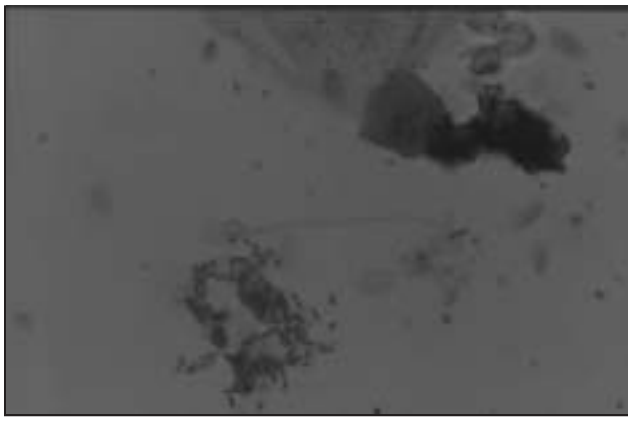

Fig 1. Urinary sediment showing epithelial cells, erythrocytes, bacteria, spermatozoids and phosphate crystals.

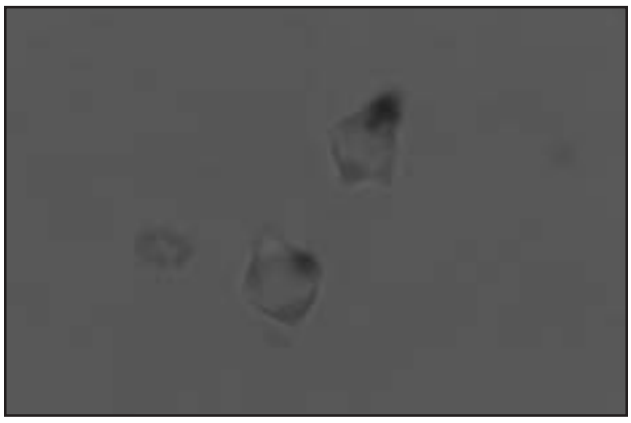

Fig 2. Typical struvite (magnesium ammonium phosphate hexahydrate) crystals observed in the urinary sediment.

Urolithiasis in camels is an usual condition found in Canaries, probably due to the fact that animals are intensively managed and salt are not always present in the farms. The ingestion of salt can suppose a higher ingestion of water and, consequently, a higher renal perfusion increasing the urine volume and avoiding the salt precipitation.

Haematological and biochemical findings indicated a stress leukogram and renal parameters increased around 10 times the normal values. Despite all, blood parameters returned to physiological range within a few days.

Phosphate uroliths, particularly struvite, are the most frequent uroliths found in ruminant species; however, there is not much information in camels. Ruminants consuming rations high in phosphorus, such as grain-based feedlot rations, commonly develop phosphate calculi. Increases in dietary phosphorus levels result in increased concentration of phosphate ion in urine (Bushman *et al*, 1965), predisposing to develop phosphate urolithiasis. Because calcium opposes phosphorus absorption from the gut, urinary excretion of phosphate is augmented by low dietary levels of calcium relative to phosphorus (Hay, 1990). The interaction of magnesium with calcium and phosphorus is less clearly understood, but increases in dietary magnesium levels induced calcium phosphate (apatite) and magnesium ammonium phosphate (struvite) urolithiasis in calves (Kallfelz *et al*, 1987).

In this case, mineral content estimated in diet was 0.30, 0.44 and 0.26% DM of calcium, phosphorus and magnesium, respectively. These data would indicate that calcium/phosphorus ratio was 1/1.5, slightly imbalanced. Calcium/phosphorus imbalance has previously been related to urinary calculi in camels (Kock, personal communication; Dorman, 1986). Magnesium level in diet was 0.26%; it has been established in growing calves that magnesium levels lower than 0.30% do not cause urolithiasis (Peterson *et al*, 1988). Probably magnesium did not play an important role in this case. Further studies are necessary in order to determine the precise conditions in which camels can develop phosphate urolithiasis.

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